GlobalAutomakers

December 11, 2018

Docket Management Facility
U.S. Department of Transportation
1200 New Jersey Avenue, SE
West Building, Ground Floor, Room W12-140
Washington, DC 20590-0001

Re: Docket NHTSA-2018-0090
Federal Motor Vehicle Safety Standards: Lamps, Reflective Devices, and Associated Equipment

Enclosed are the comments of the Association of Global Automakers, Inc., with regard to NHTSA's October 12, 2018, notice of proposed rulemaking (NPRM) on amendments to Federal Motor Vehicle Safety Standard (''FMVSS'') No. 108 (*Lamps, reflective devices, and associated equipment*) to permit the certification of adaptive driving beam headlighting systems. If you have any questions on this matter, please contact me.

Sincerely,

Steve Gehring
Vice President, Vehicle Safety and Connected Automation

Enclosure

GlobalAutomakers

COMMENTS OF THE ASSOCIATION OF GLOBAL AUTOMAKERS, INC., REGARDING NHTSA'S OCTOBER 12, 2018 NOTICE OF PROPOSED RULEMAKING TO PERMIT THE CERTIFICATION OF ADAPTIVE DRIVING BEAM HEADLIGHTING SYSTEMS

DOCKET NO. NHTSA-2018-0090

1. Introduction

The Association of Global Automakers, Inc., ("Global Automakers")[1] appreciates the opportunity to provide comments in response to the October 12, 2018, NHTSA's proposal to revise FMVSS 108 so as to permit the certification of adaptive driving beam (ADB) headlighting systems.

Global Automakers supports NHTSA amending FMVSS 108 to accommodate the deployment of ADB in the United States as doing so will yield positive safety benefits. As discussed in the Notice of Proposed Rulemaking (NPRM), improved visibility associated with the deployment of ADB headlighting systems will lead to a reduction in fatalities and injuries associated with crashes involving pedestrians, cyclists, animals, and roadside objects.

Notwithstanding our overall support for amending FMVSS 108 to accommodate the deployment of ADB headlighting systems, we have concerns with the agency's proposal to establish unique requirements for the U.S. market. Because our member companies produce vehicles for the global market, harmonization of motor vehicle safety requirements has been, and continues to be, of the utmost importance. As discussed in greater detail below, we believe that the proposal can be improved by relying more on the specifications contained in SAE J3069 and less on establishing unique U.S-specific requirements, especially those that provide little to no incremental safety benefit.

Our comments (contained in Section 2) address the following topics:

- NHTSA's Overall Basis for the NPRM
- The NPRM in Relation to SAE J3069
- ADB Glare Limits
- Existing Photometry Requirements Having Applicability to ADB Systems
- Other System Requirements
- Beam Selector Switch
- Stimulus Vehicle Criteria
- Additional Details

1 The Association of Global Automakers represents the U.S. operations of international motor vehicle manufacturers, original equipment suppliers, and other automotive-related trade associations. Global Automakers works with industry leaders, legislators, regulators, and other stakeholders in the United States to create public policies that improve motor vehicle safety, encourage technological innovation and addresses environmental needs. Our goal is to foster an open and competitive automotive marketplace that encourages investment, job growth, and development of vehicles that can enhance Americans' quality of life. Our members' account for 40 percent of all U.S. production and international automakers account for 47 percent of all U.S. sales of passenger vehicles and light trucks. For more information, visit www.globalautomakers.org.

2. Comments on NHTSA's Proposed Amendments to FMVSS 108

NHTSA's Overall Basis for NPRM
Global Automakers does not agree with the Agency's determination that an ADB headlighting system would not be supplemental equipment, but does agree that, unless amended, FMVSS 108 would prohibit the deployment of ADB. Thus, it is appropriate and necessary to amend FMVSS 108 to permit the certification of ADB headlighting systems in the U.S.

The NPRM in Relation to SAE J3069
Relative to SAE J3069, the NPRM would require a more robust track test to evaluate glare, and also require additional laboratory-tested equipment-level photometric requirements to regulate both glare and visibility. Specifically:

- The proposed track test includes a variety of different scenarios that vary the road geometry (straight or curved); vehicle speeds (from 0 to 70 mph); and vehicle orientation (whether the stimulus vehicle is oncoming or preceding), using actual vehicles rather than test fixtures that simulate oncoming and preceding vehicles, and measuring ADB illuminance at a greater number of specified distance intervals.

- To limit glare, the NPRM would require that the part of the adaptive beam that is cast near other vehicles not exceed the current low beam maxima, and the part of the adaptive beam that is cast onto unoccupied roadway not exceed the current upper beam maxima.

- To ensure sufficient visibility for the driver, the NPRM would require that the part of the adaptive beam that is cast near other vehicles comply with the current lower beam minima and that the part of the adaptive beam that is cast onto unoccupied roadway comply with the upper beam minima.

Global Automakers does not support NHTSA's proposal to go beyond SAE J3069 in any substantive way. NHTSA's proposal to fully require both vehicle-level track testing and laboratory-based photometric requirements provides no additional measurable safety benefits that justify the additional burden of compliance associated with the proposed test procedures.

We believe that more complete referencing of SAE J3069 would result in vehicles that achieve similar or better performance with respect to glare reduction and visibility with greater repeatability of compliance and lower testing costs. Greater reliability and lower cost can be achieved by:

- limiting the array of road geometries for testing, and
- not requiring the additional laboratory-based photometric requirements beyond those included in SAE J3069.

To summarize, we believe that SAE J3069 will result in better target illumination and glare reduction, at lower cost to the public. We therefore recommend NHTSA base the final rule on the ADB requirements contained in SAE J3069 and avoid establishing unique new requirements that are not justified by a cost-benefit assessment.

Further comments regarding SAE J3069 and its suitability are interspersed below.

ADB Glare Limits

There should be an allowance to exceed the exact values, as long as the ADB does not exceed that same headlamp's low-beam measured glare values by more than 125%. This does not assure that the headlamp will exceed the glare limits proposed for ADB. This method better represents real world conditions, automatically compensating for environmental factors such as dips and bumps in the road, reflectivity of lane markers, ambient light, etc., as well as compensating for any vehicle pitching due to curves and speed.

Existing Photometry Requirements Having Applicability to ADB Systems

Table XVIII upper beam requirements

In addition to track-tested glare limits, compliance with the rule as proposed would require that ADB systems be subjected to some of the existing laboratory-based upper and lower beam photometry requirements. When the ADB system is producing an upper beam (i.e. when there are no oncoming or no preceding vehicles within 15 m to 220 m), NHTSA proposes that the beam be subject to all of the applicable Table XVIII upper beam requirements. In addition, NHTSA proposes that, in the undimmed portion of the adaptive beam, the applicable Table XVIII upper beam maxima and minima be met. Similarly, the lower beam maxima and minima are proposed to be complied with within the dimmed portion of the adaptive beam. We can see no safety reasons to require Table XVIII upper beam performance in the absence of other road users and thus recommend that NHTSA delete this provision in the final rule.

The intensity transition within the beam of ADB

Global Automakers believes that there should be a transition between the glare and non-glare zone within the ADB beam. It is not possible to achieve sharp cutoffs within the beam to achieve such transitions as required. We recommend that the word "fully" be inserted to allow for such transitions. It would be inserted before "within the area of fully unreduced intensity" in S9.4.1.6.6 and S9.4.1.6.7, as seen below in a revised S9.4.1.6.6.

> *S9.4.1.6.6 When the system is producing a lower beam with an area of reduced light intensity designed to be directed towards oncoming or preceding vehicles, and an area of unreduced intensity in other directions, the system must be designed to conform to the photometric intensity requirements of Table XIX-a, XIX-b, or XIX-c as specified in Table II for the specific headlamp unit and aiming method, when tested according to the procedure of S14.2.5, and, for replaceable bulb headlighting systems, when using any replaceable light source designated for use in the system under test, fully within the area of reduced intensity.*

If this is not possible or unacceptable, then the Final Rule should allow for an independent mid-beam (essentially, a partial high beam), independent of the lower or upper beam.

Other System Requirements

S.9.4.1.3 Fail Safe Operation

The proposal applies some existing semiautomatic beam switching device requirements to ADB systems including fail safe operation (S9.4.1.3). Global Automakers recommends that the system should fail safe on the high beam, with the driver choosing to switch to low beam whenever the need for glare reduction occurs. We recommend amending S9.4.1.3 as follows:

S9.4.1.3 Fail safe operation. A failure of the automatic control portion of the device should fail safe to the high beam and must not result in the loss of manual operation of both upper and lower beams.

S9.4.1.5—Option 1 (Semiautomatic Headlamp Beam Switching Devices)
The old test procedure for Semiautomatic Headlamp Beam Switching devices describes a test procedure of the "camera" device and not a test procedure for the overall system as is now proposed. This is an increase in stringency and should be justified by NHTSA prior to finalizing.

S9.4.1.6—Option 2 (Adaptive Driving Beam Systems)
Option 2 should be applicable also for standard Automatic High Beam. The Option 2 test procedure describes a real-life scenario and allows the system to optimize considering different types of light sources. Therefore, Global recommends NHTSA retitle S9.4.1.6 to read as follows: 9.4.1.6—*Option 2 (Adaptive Driving Beam Systems and Automatic High Beam Systems).*

Failure to address the need for horizontal aim adjusters
There is a requirement in the FMVSS 108 (S10.18.9.2) which addresses lower beam horizontal aim. It reads as follows: "There is no adjustment of horizontal aim unless the headlamp is equipped with a horizontal VHAD. If the headlamp has a VHAD, it is set to zero." The NPRM does not consider horizontal aim adjustment for ADB and thus effectively prohibits horizontal aim adjusters for ADB headlamp systems. This is a poor choice because it does not take into account the need to correctly reset horizontal aim after repair or replacement from collision damage. Global Automakers recommends that horizontal aiming be required or at least allowed.

Beam Selector Switch

Table I-a of FMVSS No. 108 states that the "wiring harness or connector assembly of each headlighting system must be designed so that only those light sources intended for meeting lower beam photometrics are energized when the beam selector switch is in the lower beam position, and that only those light sources intended for meeting upper beam photometrics are energized when the beam selector switch is in the upper beam position, except for certain systems listed in Table II." Global Automakers believes that this existing requirement might adversely affect design choices for the headlight and/or ADB controls. Potentially, it means that the headlight and ADB controls cannot be designed so the ADB system is activated when the beam selector switch is in the lower beam position—the ADB system might, if no other vehicles are present, be projecting the upper beam, which could mean that upper beam light sources are activated when the beam selector switch is in the lower beam position.

To address this design choice issue, Global Automakers recommends adding an exception to Table I-a as follows: "Except for Adaptive Driving Beam Systems." Alternatively, there should be three operational modes that the driver can choose: low beam, high beam, and ADB (Low and high beams would continue to meet current photometry and selecting the ADB operational mode would achieve the use of ADB actively preventing glare). If such a three mode operation is actually deemed a necessary alternative, it's regulatory language should also accommodate the Automatic High Beam system, too.

Stimulus Vehicle Criteria

NHTSA asked whether the proposed set of stimulus vehicles is so large as to be impracticable or unnecessary. If so, in what specific ways would manufacturers find them impracticable, or why are they unnecessary (i.e., how can the Agency be confident that glare prevention is adequately ensured with a smaller set of possible stimulus vehicles)?

Global Automakers believes that the proposed range of vehicles is too broad. Such a broad range may cause random and non-repeatable non-conformance issues. There needs to be consistency in any testing. The testing could bookend the vehicle population's performance (i.e., lowest/highest, narrowest/widest) to constrain the massive number of stimulus vehicles. Some estimate that there could be as many as 400 or more testing scenarios. Taking into account the number of different light source/headlamp technologies to ensure the robustness of the ADB, the number of stimulus vehicles is many times larger than the estimation above. Like SAE, Global Automakers believes that a standard lamp mounted on a test fixture may be a reasonable solution.

Additional Details

New Physical Test Requirements Discussed on Page 51781

On page 51781 of the notice, NHTSA wrote that it is not proposing any new physical test requirements, and it seeks comment on whether it should specify physical test or additional device test requirements. Global Automakers does not support adding any new physical test requirements.

Minimum sampling rate (discussed on page 51785 and in S14.9.3.12.2.2)

On page 51785 of the notice, NHTSA wrote that, in conducting compliance testing, the agency would use a sampling rate of at least 200 Hz when recording test data. This is reflected in the requirements contained in S14.9.3.12.2.2. Global Automakers requests NHTSA explain in the final rule the appropriateness of this minimum sampling rate, as well as whether a maximum sampling rate should be specified in the standard and, if so, what it should be.

Removing noise

In accordance with S14.9.3.12.2.2 (discussed above), the illuminance values from the photometers shall be collected at a rate of at least 200 Hz. Global Automakers would like to know, based on what standards are OEMs permitted to remove test data noise from measured data. If there are known standards, it may be prudent to incorporate these into the Final Rule or the formal compliance test procedure.

Definition of "spike"

The term "spike" is used in S.14.9.3.12.8.1, but not defined. Global Automakers recommends NHTSA establish a definition for the term "spike" relative to accommodating the natural behavior of certain headlamp light sources to have a "spike" of light intensity during the sequence of use.

Missing Regulatory Text

On Federal Register page 51810, S14.9.3.12.4.5 is missing. NHTSA should determine if there is a missing requirement or if this was a mistake in numbering.

Typographical Error

On page 51811 of the notice, in S14.9.3.12.8.1, there is likely a typographical error. It states: "The maximum illuminance will be the single highest illuminance recorded within the distance range excluding momentary spikes above the limits lasting no longer than 0.1 sec. or over a distance range of no longer that 1 meter." The word "that" should be replace with "than."